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30 Joint priority: 1629/98 09/30/1998 AT	72 Inventor: See applicant.
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The following data were taken from the documents filed by the applicant.

## 54 Beverage-serving machine

57 A beverage-serving machine for preparing and serving different beverages mixed from water and different syrup types, fitted with several storage tanks (15) for storing of different syrup types and with a water feed pipe (1), in which case each storage tank (15) is connected to the suction opening (22) of each water jet mixing head connected to the water feed pipe for each syrup type, and in which case a central distribution element (9) is provided in the form of a closed hollow unit, into which enter the syrup feed pipes (5) of the storage tanks (15) for the different syrup types, and in which case a one-way valve (16) is arranged at the end of each syrup feed pipe (5) and a central mixing head (7) is provided, whose suction opening (22) is, by way of a central syrup feed pipe (3), connected to an outlet opening of the central distribution element (9) and in which case a water feed opening (23) is fitted in the central distribution element (9) to supply it with water.

/diagram: STEUERUNG = CONTROL UNIT/

Description

The invention concerns a beverage-serving machine for preparing and serving different beverages that are mixed from water and different syrup types, fitted with several storage tanks for storing the different syrup types and with a water feed pipe, in which case each storage tank is connected to the suction opening of a water jet mixing head for each syrup type connected to the water feed pipe, thus making it possible to pipe the syrup to the water jet mixing head by way of the water jet created in the water jet mixing head and to mix it there with water, in which case the beverage is served by way of a discharge unit.

Known serving machines of this type permit beverage preparation by diluting an available syrup with the available water, thus substantially reducing the delivery volume for beverage bottles with a diluted content.

EP-A1-0 240 706 describes a water jet injection device for preparing and serving mixed beverages made from fruit syrup or concentrates and water, in which case a water jet passes through a mixing chamber and suctions the fruit syrup out by way of a lateral opening. The wall of the injection housing is fitted with a radially sliding baffle element that, by way of an operating element, slides into the water jet and thus affects a disturbance in the injection effect, thus having a return valve interrupt the syrup feed flow and create a swirling flushing flow in the mixing chamber, thus supporting the cleaning effect.

In that manner, the water jet creating the injection effect may be used to flush the mixing chamber and all injection device components that come into contact with the mixed beverage. The flushing may occur in the last phase of the beverage discharge thus using the remaining water quantity for mixing the beverage as the flushing water. However, the syrup feed pipe is not flushed and it can be connected to only one syrup storage tank to prevent flavor contamination by different syrup types.

EP-A-0 228 927 describes a beverage-serving machine consisting of a cooled and pressurized potable water tank and of several syrup tanks that are arranged side-by-side, whose feed pipes always end in a respective mixing head. The syrup feed pipe to the mixing head contains an electro-magnetically controlled valve to control the syrup flow to the mixing head. A water jet created by the water supply suctions the syrup in a venturi pipe, where it is mixed and served by way of a discharge unit. To clean the pipes used to pipe the beverage liquid, pure water is, by way of the valve that controls the water supply, passed through these pipes while the syrup feed pipe is closed. Since a separate mixing head is provided for each syrup, this type of cleaning is sufficient to prevent different syrup types from mixing. However, the need for such separate mixing heads increases the required number of units in comparison with just one central mixing head.

WO-A1-85/05092 describes a beverage-serving machine for diluting concentrated orange juice, in which the concentrate is, by way of a water jet, suctions from a concentrate tank and through a suction pipe with return valve into a mixing head, in which it is mixed with water. There is only one concentrate tank with no cleaning provisions.

Furthermore, DE-U1-83 33 154 concerns a device for preparing a refreshment beverage mixed from water and syrup, in which a water jet pump suctions the syrup in a conventional manner from a storage tank to then be mixed with water. There is no mention of a special cleaning process.

AT-E-63 291 discloses a device for the preparation of beverages with carbon dioxide that consists of a concentrate metering unit and a concentrate supply bottle. In that system, the

concentrate is, by way of carbon dioxide, suctioned into a metering chamber of the feed bottle and then mixed with water containing carbon dioxide; this mixture is then served into a suitable drinking glass. However, there is no mixing of the concentrate and water with a jet pump.

Finally, GB-A-2 256 636 describes a beverage discharge nozzle consisting of a central nozzle for the syrup and a water feed nozzle arranged at an angle to the nozzle axis; water and syrup are thus combined into a joint discharge flow and are mixed. The water flow as well as the syrup flow are produced with suitable pumps and no water jet pump is used.

The disadvantage of the known discharge units consist in the fact that the preparation of several syrup types requires many units since each syrup type requires its own mixing head.

Accordingly, the task of the invention consists in the technically simple removal of syrup beverages of different flavors and/or of a different consistency from a beverage-serving machine, in which case there will be no residues of one syrup when switching from one syrup to another, thus preventing a change in the taste of the desired beverage.

In accordance with the invention, this is achieved by providing a central distribution element in the form of a closed hollow unit, at which enter the syrup feed pipes from the storage tanks for the different syrup types, in which case the end of each syrup feed pipe is fitted with a one-way valve, and by providing a central mixing head, whose suction opening is, by way of a central syrup feed pipe, connected to an outlet opening of the central distribution element, and by providing a water feed opening in the central distribution element to feed water to this element.

The combination of several syrup feed pipes in a central distribution element requires just one mixing head, in which all syrup types can be mixed. By providing a water feed opening, it is possible to flush the central distribution element after each syrup discharge. Flavor contamination of the next syrup type by the first syrup type is thus prevented.

In a further design of the invention, it is possible to install a one-way valve in the central syrup feed pipe. This valve prevents water from returning from the central mixing head to the central mixing element.

Furthermore, and according to another version of the invention, a pipe branching from the water feed pipe can be connected to the water feed opening of the central distribution element, through which it is possible to clean the central distribution element and the syrup feed pipe of syrup residues between two sequential beverage discharges.

According to a further design of the invention, the branching pipe may be connected to the water feed pipe by way of a controllable by-pass valve. The valve can be used to fully automate the flushing process, in which case the syrup supply can be metered such that the required quantity of clean water can be added to the beverage after the mixing process to achieve the correct mixing ratio.

In a further development in accordance with the invention, an adjustable shut-off valve is installed downstream of the by-pass valve to automatically control the main water supply to the mixing head or to affect the switching from beverage mixing to flushing phase.

The invention will be explained in the following in more detail with the help of the design example shown in the enclosed drawing. In that regard, **Figure 1** shows a schematic representation of the device in accordance with the invention.

**Figure 1** shows a beverage-serving unit for preparing and serving different beverages that are mixed from water and different syrup types, in which case only one of several syrup storage tanks 15 is shown, which preferably consists of a plastic pouch that is connected to syrup feed pipe 5, in which is installed an adjustable magnet valve 10 through which the syrup feed is possible through central control unit 12, in which case the feed quantity can be adjusted. As a

function of the syrup type that has been selected, the respective magnet valve **10** opens and all others close. It is also possible to mix different syrup types.

In accordance with the invention, a central distribution element **9** is provided in the form of a closed hollow unit, at which enter syrup feed pipes **5** of storage tanks **15** with the different syrup types. A one-way valve **16**, such as a return valve, is provided at the end of each syrup feed pipe **5** and permits the respective syrup to flow to distribution element **9**. One-way valves **16** prevent another syrup type or water from entering syrup feed pipe **5**.

All other syrup storage tanks not shown here are, through their own feed pipe **5** and one one-way valve **16**, connected to distribution element **9**. As explained earlier, the syrup selection is made with magnet valve **10**.

Also provided is a central mixing head **7**, such as a water jet pump, whose suction opening **22** is, through a central syrup feed pipe **3**, connected to outlet opening **24** of central distribution element **9**. In that manner, and through suction opening **22** of central mixing head **7** and the respective opened magnet valve **10**, syrup can be suctioned from respective syrup tank **15** by taking advantage of the vacuum created by the water jet in mixing head **7**. The syrup thus passes through central mixing element **9** and its outlet opening **24**. In that manner, one mixing head **7** is sufficient to mix all syrup types in this head with water and to serve the mixed beverage through discharge pipe **21** into a drinking glass **6**, for example.

Accordingly, one of the magnet valves **10** will be open and all others will be closed when serving a beverage of a certain flavor. The flow through the cross-section of the respective open magnet valve **10** can be adjusted and the syrup concentration in the beverage can be selected in any way. The suction pressure is created by a water flow that runs through mixing head **7** and can be turned on and off by way of adjustable shut-off valve **13**.

In the event of pressure variations or interruptions in the water supply, one-way valve **17**, **8** installed in central syrup feed pipe **3** prevents water from entering distribution element **9**.

Under normal conditions, under natural pressure or by way of a pump not shown here, the water from water feed pipe **1** flows through cooling coil **11**, in which the temperature is, by way of a heat exchange, reduced to a temperature suitable for beverages, and through by-pass magnet valve **14** and shutoff magnet valve **13** arranged downstream into central mixing head **7** that on its inside produces a sufficient vacuum to suction-in the selected syrup that enters through syrup feed pipe **3** and suction opening **22** into water jet pump **7**, where it is whirled with the flowing water and is thus mixed. The beverage mixed in that manner is collected in a drinking cup or glass **6** and is ready for consumption. In that regard, the desired syrup taste, concentration and serving quantity can be entered or set through central control unit **12** in such a manner that the discharge unit shown here can also be used for vending machines or sales devices in gastronomic businesses.

After each serving of a beverage, the residues of at least one specific syrup type are to be found in central distribution element **9** and in feed pipe **3**. Both are cleaned by providing water feed opening **23** in central distribution element **9** through which water can be supplied. A branch pipe **4** branching from water feed pipe **1** is connected to water feed opening **23** of central distribution element **9**.

A pipe **3** fully cleaned from syrup and an inside volume of central distribution element **9** completely without any residues is ensured by passing the water flow with the help of valve **14** not through pipe **2** but through branching pipe **4** that, by way of water feed opening **23**, runs to distribution element **9**. In that regard, one-way valves **16** of syrup feed pipes **5** prevent the flushing water that has reached distribution element **9**, and entered mixing head **7** through pipe **3**

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from returning, and it is removed through its discharge pipe **6**. Prior to the syrup beverage being served in cup **6**, the flushing water must first be piped to a respective collecting tank not shown here or the syrup quantity must be metered such that the following mixing step with the almost pure flushing water produces the correct mixing ratio. The flushing occurs for a relatively short time that is sufficient to flush all syrup residues from distribution element **9** and pipe **3**. The discharge unit is then ready for the next beverage discharge and its feed of different syrups does not require separate pumps, making it possible to discharge several different syrup beverage types through one central mixing device.

The serving quantity is controlled when the time magnet valve **13** is activated, while magnet valve **14** is always activated when a change in flavor is required when switching from one beverage discharge to another.

Patent claims

1. A beverage-serving machine for preparing and serving different beverages mixed from water and different syrup types, fitted with several storage tanks for storing different syrup types and with a water feed pipe, in which case each storage tank is connected to the suction opening of each water jet mixing head connected to the water supply for each syrup type, thus piping the syrup by way of the vacuum produced in the water jet mixing head by the water flow and mixing the syrup in it, in which case the mixed beverage can be served through a discharge pipe, **characterized by the fact that** a central distribution element (9) is provided in the form of a closed hollow unit, in which enter the syrup feed pipes (5) of the storage tanks (15) for the different syrup types, and in which case a one-way valve (16) is arranged at the end of each syrup feed pipe (5) and a central mixing head (7) is provided, whose suction opening (22) is by way of a central syrup feed pipe (3), connected to an outlet opening (24) of the central distribution element (9), and in which case a water feed opening (23) is fitted in the central distribution element (9) to supply it with water.
2. A beverage-serving machine in accordance with claim 1, characterized by the fact that a one-way valve (17) is provided in the central syrup feed pipe (3).
3. A beverage-serving machine in accordance with claim 1 or 2, characterized by the fact that a branch pipe (4) from the water feed pipe (1) is connected with the water feed opening (23) of the central distribution element (9).
4. A beverage-serving machine in accordance with claim 3, characterized by the fact that the branch pipe (4) is connected with the water feed pipe (1) through an adjustable by-pass valve (14).
5. A beverage-serving machine in accordance with claim 4, characterized by the fact that an adjustable shut-off valve (13) is arranged in the water feed pipe (1) and downstream of the by-pass valve (14).

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1 page with drawings forms a part of this document

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DRAWING PAGE 1

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STEUERUNG = CONTROL UNIT

FIG. 1